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HANDBOOK IN

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CURRICULUM GUIDE

INDUSTRIAL EDUCATION

FOR GUIDANCE TO
TEACHERS, CONSELLORS AND
ADMINISTRATORS

Alberta

EDUCATION

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PREFACE

The purpose of this Handbook is to provide ready access to information concerning the Industrial Education program.

Teachers will find information on objectives, how their particular subject could be co-ordinated with the work of other teachers, methods of organizing content and processes, as well as suggestions for managing the laboratory or shop.

Counsellors should find the Industrial Education program organization with the matrix defining major, minor and related areas useful in helping students plan their total program.

Administrators will find the document useful in helping them understand the purpose of Industrial Education in the context of their system and then plan ways of making it functional.

The materials in this Handbook have been developed over many years by various committees and individuals and we acknowledge our indebtedness to all those who see some of their ideas presented here.

J. D. Harder, Ed.D.

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INDUSTRIAL EDUCATION HANDBOOK

I. INTRODUCTION

Industrial Education has in the past decade added a new dimension to the program for educating young people at the secondary school level. For many students it has opened new options to help prepare them for the life ahead while enjoying their studies now. The authors of the Industrial Education curriculum recognize that the needs of society have changed and with them the approach to knowledge acquirement. Students today must be helped; to learn how to learn, to conduct inquiry, to study independently, to make choices and decisions, to use technology, and to live with change.

The Industrial Education program is concerned with career development. Because careers today do not develop along predictable lines our education program must provide considerable flexibility so that students have an option of several career choices. This is possible for several reasons. A person who has been broadly educated is able to learn what he needs to know, within limitations, about a new job. With the general education level of the society rising the future worker needs a broad as well as experience based education. Such an education offers him subsequent chances for rapid and successful specialization. With this in mind the learning experiences should be such that they become the basis upon which specialization can be built.

Our task in the secondary school then, is to provide students not only with entry skills for several careers but to orient the program to meet social and cultural goals. This means that the various courses or disciplines must be interrelated. Industrial Education provides a unique opportunity for the teacher to demonstrate these relationships and, further, to goals of Industrial Education by means of the motivation created through practical applications.

Thus the experiences students are exposed to should provide them with realistic criteria for career guidance.

This handbook will outline the goals of Industrial Education and suggest procedures and ideas to help students achieve them.

II. INDUSTRIAL EDUCATION - DEFINITION

Industrial Education is a program consisting of courses that provide a continuum of experiences, starting with exploratory experiences and activities in the elementary and junior high school, expanding in the high school to the development of skills in career fields, and culminating in on-the-job experience.

Industrial arts, the exploratory phase of the continuum, provides the opportunity for the students to explore, reason, experiment and discover the reality of the technological society in which they live. The content of the program deals with industry, its organization, materials, processes, products, occupations, and the problems resulting from the impact of technology on society.

Following the exploratory phase, students may begin orientation studies in a career field. They may select courses of a more general nature in the Industrial Education 10 series or alternately take an introductory course related directly to a career field. From here they advance to the more specific courses in the Industrial Education program which prepare them for a career. Chart I on page 3 illustrates the Industrial Education program in conceptual form showing the advancement of a student from the awareness or familiarization stage to exploration, orientation, material processes, drawing and interpretation and a knowledge of the basic concepts related to the technologies. All the courses place emphasis on practical work and applied theory.

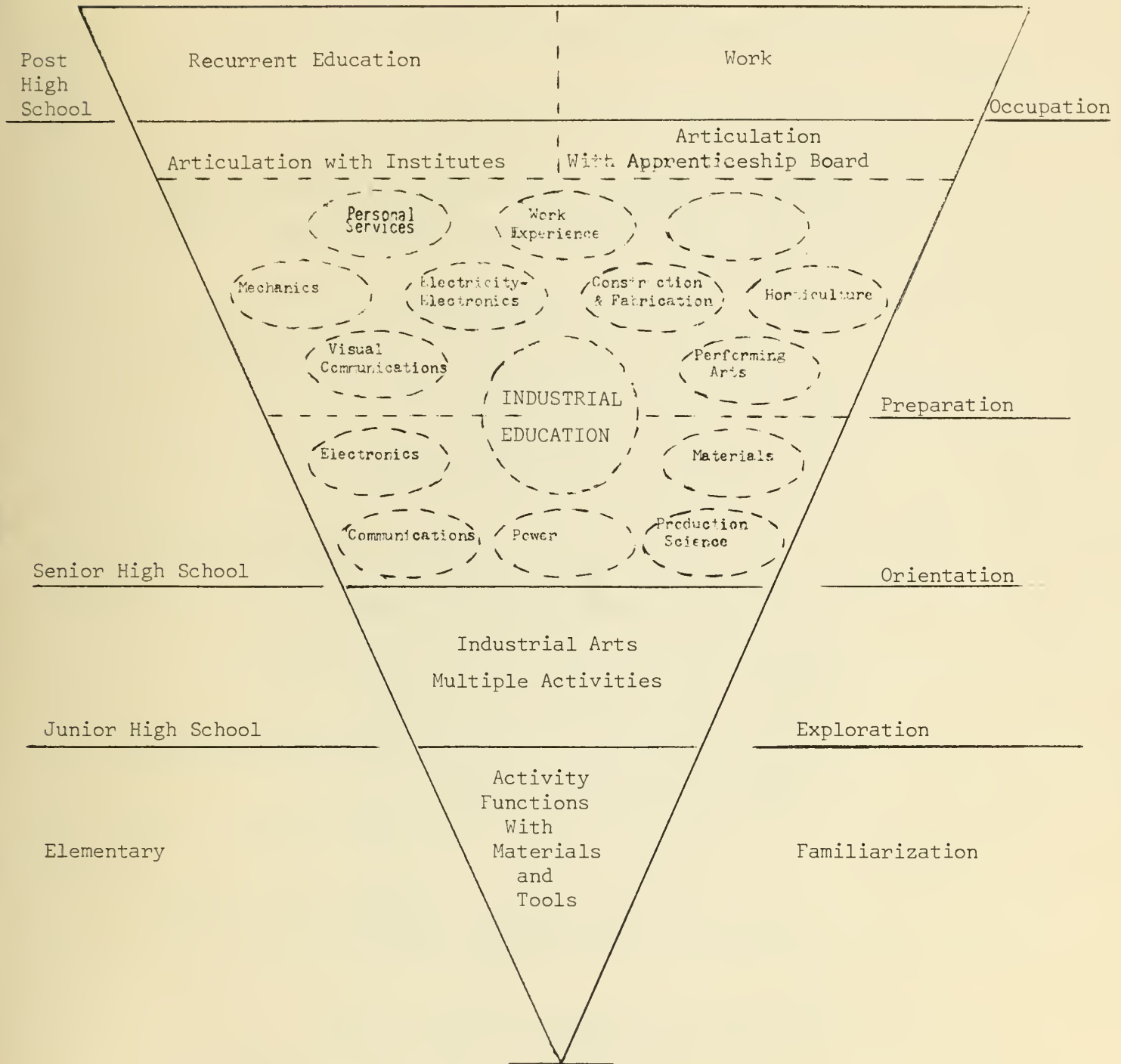
III. OBJECTIVES

The educational programs in our schools must give students an opportunity to start a life plan - a plan that prepares them for coping with their needs immediately following school, yet at the same time allowing considerable opportunity to multiply their choice of career options. The Industrial Education program provides such options through the introduction of courses in modules of 125 hours that can be sequenced in a number of patterns. Such a program capitalizes on the student's interests while adding relevance to the tool subjects such as mathematics, science and English.

ALBERTA INDUSTRIAL EDUCATION PROGRAM

FOR

CAREER CHOICE AND DEVELOPMENT



The development of positive attitudes to craftsmanship, work and the fellow worker are all important responsibilities shared by the schools.

The "Goals of Education" were revised in 1975 and are as follows:

A student in Alberta schools should:

1. Learn to be a good citizen.
 - a. Develop an awareness of civic rights and responsibilities.
 - b. Develop an understanding of the Canadian and other forms of government.
 - c. Develop a feeling of cultural identity and heritage at national and international levels.
 - d. Develop an attitude of respect for public and private property.
 - e. Develop an understanding of the obligation and responsibilities of Canadian and world citizenship.
2. Learn about and try to understand the changes that take place in the world.
 - a. Develop ability to adjust to the changing demands of Canadian society.
 - b. Develop an awareness of and the ability to adjust to a changing social and physical environment.
 - c. Develop understanding of the past, identity with the present and the ability to meet the future.
3. Develop skills in communication (listening, speaking, reading, writing, viewing).
 - a. Develop skill in understanding the communication of others.
 - b. Develop ability in communicating ideas and feelings effectively.
 - c. Develop skill in oral and written languages.
4. Learn how to organize, analyze and use information in a critical and objective manner.
 - a. Develop ability to organize information into meaningful categories.

- b. Develop ability to apply scientific methods in the pursuit of and analysis of knowledge.
 - c. Develop skills of thinking and proceeding logically.
- 5. Learn to respect and to get along with people of varying beliefs and life styles.
 - a. Develop appreciation and respect for the worth and dignity of individuals.
 - b. Develop an understanding of functions, responsibilities and achievements of various societal institutions.
 - c. Learn to take into account the values of others when making personal choices.
- 6. Learn about the world of work.
 - a. Develop a feeling of pride in achievement and progress.
 - b. Develop the ability to use information and counselling services related to career decisions.
 - c. Develop skills basic to the world of work.
- 7. Develop management skills.
 - a. Develop an understanding of economic principles and responsibilities.
 - b. Develop skills in managing natural, financial and human resources.
- 8. Develop a desire for learning.
 - a. Develop intellectual curiosity and eagerness for lifelong learning.
 - b. Develop a positive attitude toward learning.
- 9. Learn how to use leisure time.
 - a. Develop interests which will lead to a wise and satisfying use of leisure time.
 - b. Develop a positive attitude toward participation in a range of leisure time activities -- physical, intellectual and creative.

10. Practice and understand the ideas of health, fitness and safety.
 - a. Develop an understanding of good physical and mental health practices.
 - b. Establish a good physical fitness program.
 - c. Establish sound personal health habits.
11. Appreciate culture and beauty in the world.
 - a. Develop creative self-expression through various media including the fine and practical arts.
 - b. Develop special talents in the arts.
 - c. Cultivate appreciation for beauty in various forms.
12. Develop basic and special knowledge competencies.
 - a. Develop understanding and skills in the use of numbers, natural sciences, mathematics and social sciences.
 - b. Develop a fund of information and concepts.
 - c. Develop special interests and abilities.



IV. PROGRAM ORGANIZATION

A. INDUSTRIAL EDUCATION 10, 20, 30 PROGRAM

The new Industrial Education program courses are identified as IE 10A, 20A, 30A, and IE 10B, 20B, and 30B.

The tens and twenties are 4-5 credits and the thirties are 5 credits.

The courses are made up of modules, each with a minimum of 25 hours of content and may be expanded to 33 hours. Four or five modules make up the requirements for 4-5 credits. The minimum number of modules for five credits would be four.

There will be approximately sixty modules to choose from with about an equal number from each of the career fields:

- Power
- Materials
- Visual Communications
- Electricity-Electronics - Computer

Specific programming will be a local decision. If a cluster of modules in an area is desired this can be scheduled. Sequence, too, will be left to the teacher and students insofar as eight modules.

Procedurally, students will register in four modules for a 4-5 credit course. The first four taken by a student will be registered as 10A. The next four modules could be called 20A and so on. If after having completed 13 to 15 credits the student wishes to continue, he/she may do so and the next course becomes 10B. An alternative would be to register in eight modules for ten credits and identify the courses as 10A and 10B. The "A" and "B" connotations have no significance other than to identify the sequence of modules.

Three modules of a general nature are also available. These are:

- Research module
- Developmental module
- Production Science module

The Industrial Education (General) series is flexible and versatile, allowing schools with one or multiple laboratories to plan maximum use of their facilities.

The modules in the Industrial Education 10, 20, 30 program are listed on page 8.

INDUSTRIAL EDUCATION 10, 20, 30 Matrix
(Each module is 25 to 33 hours in length)

CAREER FIELD

A. Electricity-Electronics	B. Materials	C. Power Technology	D. Visual Communications
1. Electricity	1. General Woods	1. Conventional Heat Engines	1. Offset Lithography
2. Electronics	2. Building Construction I	2. Small Engine Tune-Up	2. Line Photography
3. Power Supplies	3. Building Construction II	3. Small Engine Overhaul	3. Black and White Photography
4. Amplifiers	4. Cabinet Making I	4. Automobile Care	4. Color Photography
5. Audio	5. Cabinet Making II	5. Automobile Tune-Up	5. Screened Photography
6. Servicing	6. General Metals	6. Mechanical Systems	6. Layout and Design
7. Radio	7. Sheet Metal	7. Electro-Mechanical Controls	7. Offset and Printing Production
8. Television	8. Machine Shop	8. Electrical Systems	8. Mechanical Drafting
9. Logic Circuits	9. Welding Arc	9. Nonconventional Power Sources	9. Topographical Drafting
10. Computer	10. Welding Gas	10. Appliance Repairs	10. Architectural Drafting
11. Electric Wiring	11. Foundry	11. Hydraulics and Fluidics	11. Relief Printing
12. Design and Construction	12. Plastics I	12. Pneumatics and Fluidics	12. Print-Machine Techniques
	13. Plastics II		
	14. Earths Ceramics		
	15. Earths Concrete		
	16. Textiles		
	17. Foods		
		E. General Modules	
		1. Developmental	
		2. Research	
		3. Production Science	

B. INDUSTRIAL EDUCATION 12, 22, 32 PROGRAM

A. Flexibility and Scheduling

The Industrial Education 12, 22, 32 program is a series of modules which develop competencies leading to seven different career fields.

Entry into a career field may be gained by taking one of several introductory courses. These are:

1. the "12" course designated for each major, or
2. two modules from the Industrial Education "10, 20, 30" series related to the anticipated major.

Following the introductory course the student may advance to the major area of study by selecting any number of five credit modules from the courses designated as "22" or "32". The scheduling and sequencing of the modules is the responsibility of the local school personnel but must be in accordance with the regulations pertaining to prerequisites.

A student registered in a second or third level course ("22" or "32") is regarded as taking a major in that course area. Having established a major the student may select courses designated as minors and in this way broaden his practical skill base to a career field or even several career fields.

The major and minor modules available in each career field and the provision for related studies make it possible to increase the options for the students.

The matrix, page 11, lists the entry level courses, the major areas of study for each career field and the related minors. In addition, a student may select courses from the Industrial Education 10, 20, 30 series, Business Education, Home Economics and/or Work Experience to supplement the career field.

Course modules, course sequences and prerequisites are shown in chart form on pages 12 - 18.

Guidance counsellors and other school personnel providing educational guidance should acquaint students with the various options keeping in mind the requirements of continuity and sequence.

Each major (with three exceptions; Beauty Culture, Food Services and Health Services) has the equivalent of 35-40 credits available in six 5-credits, and one 5 or 10 credit block.

The specific methods used in programming the modules are left to the local school. Two examples will illustrate how schools may differ.

School A - Grade 10 students have a choice of four modules from the Industrial Education 10 course. Two of these modules should be in one field, e.g. mechanics, so that the student has the prerequisite 65 hours for a "22" course.

In Grade 11 the students follow through on a major for 10 credits and a minor for 5.

In Grade 12 the students continue with a major for 10 credits and a minor for 5. A program in Mechanics could be organized as follows over a three year sequence.

Level 1	Level 2	Level 3
<u>Grade 10</u>	<u>Grade 11</u>	<u>Grade 12</u>
Industrial Education 10	Automotives 22A	Automotives 32A (Major)
- Power Technology (2 modules)	Automotives 22B	Automotives 32B (Major)
- Machine Shop (1 module)	Welding 12 (Minor)	Electricity 12 (Minor)
- Drafting (1 module)		

School B - The students begin at Level One with a module of 5 credits. This is followed by two blocks of 10 credits each in Grades 11 and 12. In Grade 12 they may go into depth by taking an additional 10 credits in their major. Such a program in the field of Mechanics could be organized as follows:

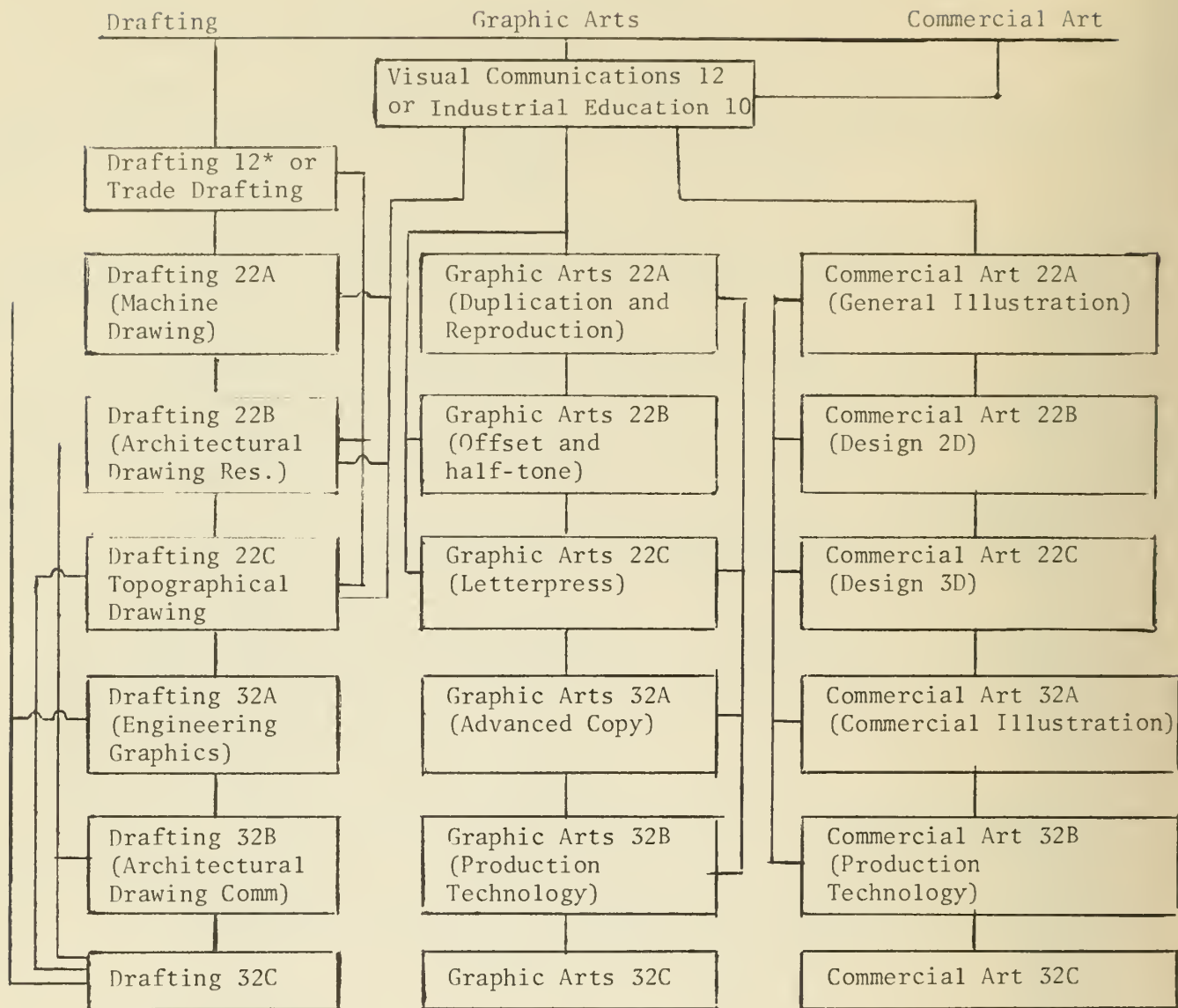
Level 1	Level 2	Level 3
<u>Grade 10</u>	<u>Grade 11</u>	<u>Grade 12</u>
Mechanics 12	Automotives 22A	Auto 22C
	Automotives 22B	Auto 32A
		Auto 32B
		Auto 32C

INDUSTRIAL EDUCATION MATRIX

Exploratory Courses	CAREER DEVELOPMENT COURSES				
	2. CAREER FIELD	3. INDUSTRIAL EDUCATION INTRODUCTORY	4. INDUSTRIAL EDUCATION MAJOR	5. INDUSTRIAL EDUCATION MINOR	6. RELATED
Industrial Arts and Home Economics at the Junior High School Level	Visual Communications	Drafting 12 Visual Communications 12 Industrial Education 10	Drafting Graphic Arts Commercial Art	See charts Drafting. Commercial Art. Graphic Arts Performing Arts	Work Experience Industrial Ed. Business Education
	Mechanics	Mechanics 12 Industrial Education 10 Auto Body 12	Automotives Aircraft Maintenance Related Mechanics Auto Body	Welding, Drafting, Machine Shop, Electricity, Auto Body, Aircraft Maintenance. Drafting, Welding, Machine Shop, Bldg. Const., Electricity, Auto Body, Automotives. Drafting. Welding, Sheet Metal, Machine Aircraft Maintenance, Automotives.	Work Experience Industrial Ed. Business Education
	Construction and Fabrication	Materials 10 Industrial Education 10 Bldg. Const. 12 Machine Shop 12 Welding 12 Piping 12 Sheet Metal 12	Building Construction Machine Shop Welding Piping Sheet Metal	Drafting, Electricity, Sheet Metal, Piping, Machine Shop, Welding. Drafting, Welding, Sheet Metal, Bldg. Const., Piping, Automotives, Auto Body. Drafting, Machine Shop, Auto, Auto Body, Sheet Metal, Piping, Bldg. Construction. Drafting, Bldg. Const., Machine Shop, Welding, Electricity, Sheet Metal. Drafting, Bldg. Const., Machine Shop, Welding, Electricity, Piping.	Work Experience Industrial Ed. Business Education
	Electricity-Electronics	Electricity-Electronics 12 Industrial Education 10	Electricity Electronics	Drafting, Automotives, Bldg. Const., Electronics. Drafting, Automotives, Bldg. Const., Electricity.	Work Experience Industrial Ed.
	Personal Services	Industrial Education 10 Beauty Culture 12 Home Economics Fashion and Furnishings Food Preparation 12 Health Services 12	Beauty Culture Fashion and Furnishings Food Preparation Health Services	Fashion and Furnishings Health Services, Food Preparation, Visual Communications, Commercial Art. Beauty Culture, Visual Communications, Commercial Art. Beauty Culture, Fashion & Furnishings, Health Services, Visual Communications, Commercial Art. Beauty Culture, Food Preparation, Fashion and Furnishings	Work Experience Industrial Ed. Business Education Home Economics Arts & Crafts
	Performing Arts		Performing Arts T. V. Crafts	T.V. Crafts, Drafting, Fashion & Fabrics, Bldg. Construction Drafting, Electricity, Bldg. Const. Performing Arts. Welding	Work Experience Industrial Ed. Business Education
	Horticulture	Horticulture 12 Land and Life	Horticulture	Drafting, Automotives Drafting, Automotives	Work Experience Industrial Ed. Business Education

Career Field - VISUAL COMMUNICATIONS

MAJORS



MINORS

Building Construction
Machine Shop
Electricity - Electronics
Welding
Sheet Metal
Piping
Graphic Arts
Commercial Art
Forestry
Aircraft Maintenance
Automotives

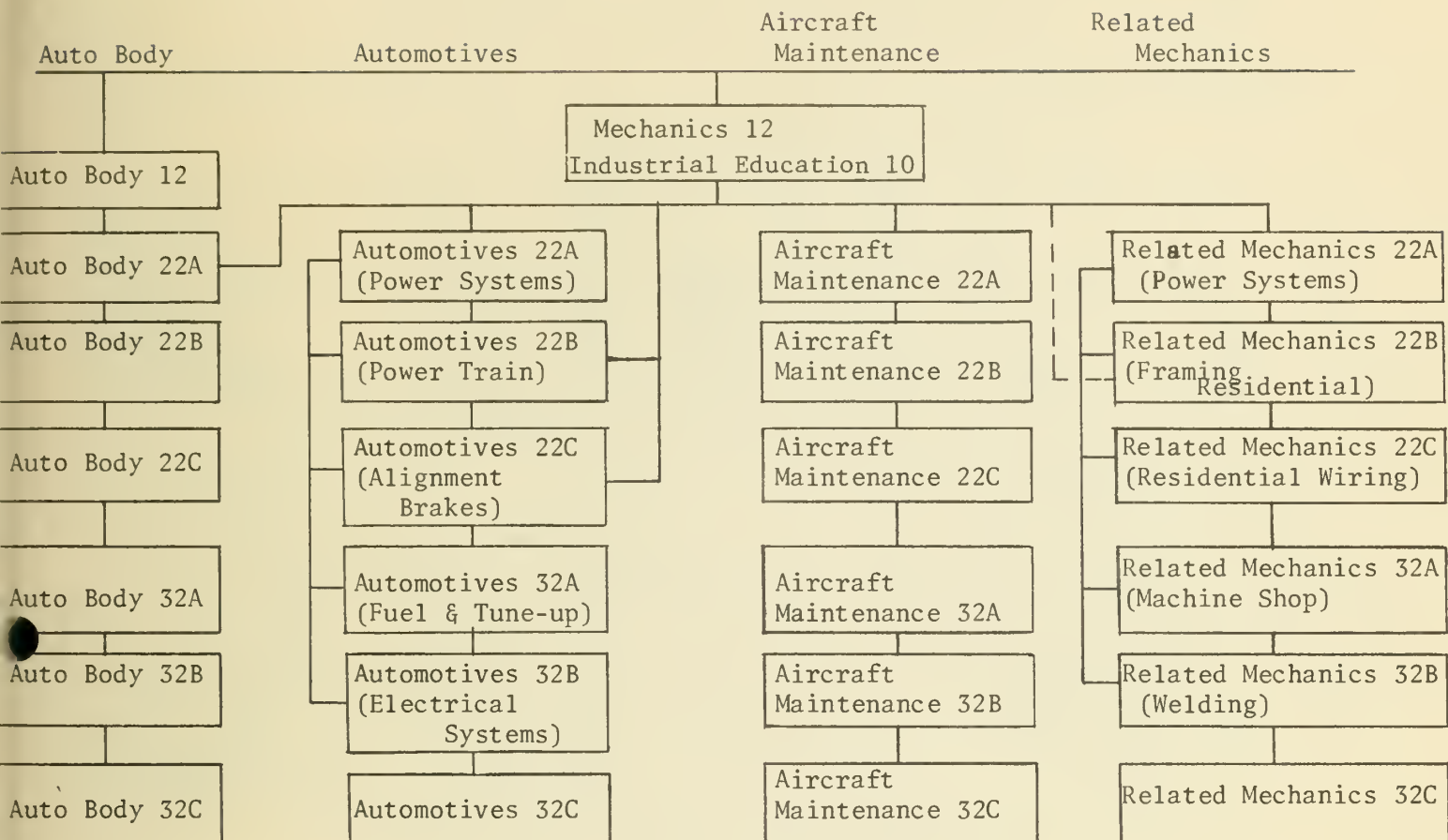
Drafting
Commercial Art

* or Drafting 10

Drafting
Graphic Arts
Performing Arts

Career Field - MECHANICS

MAJORS

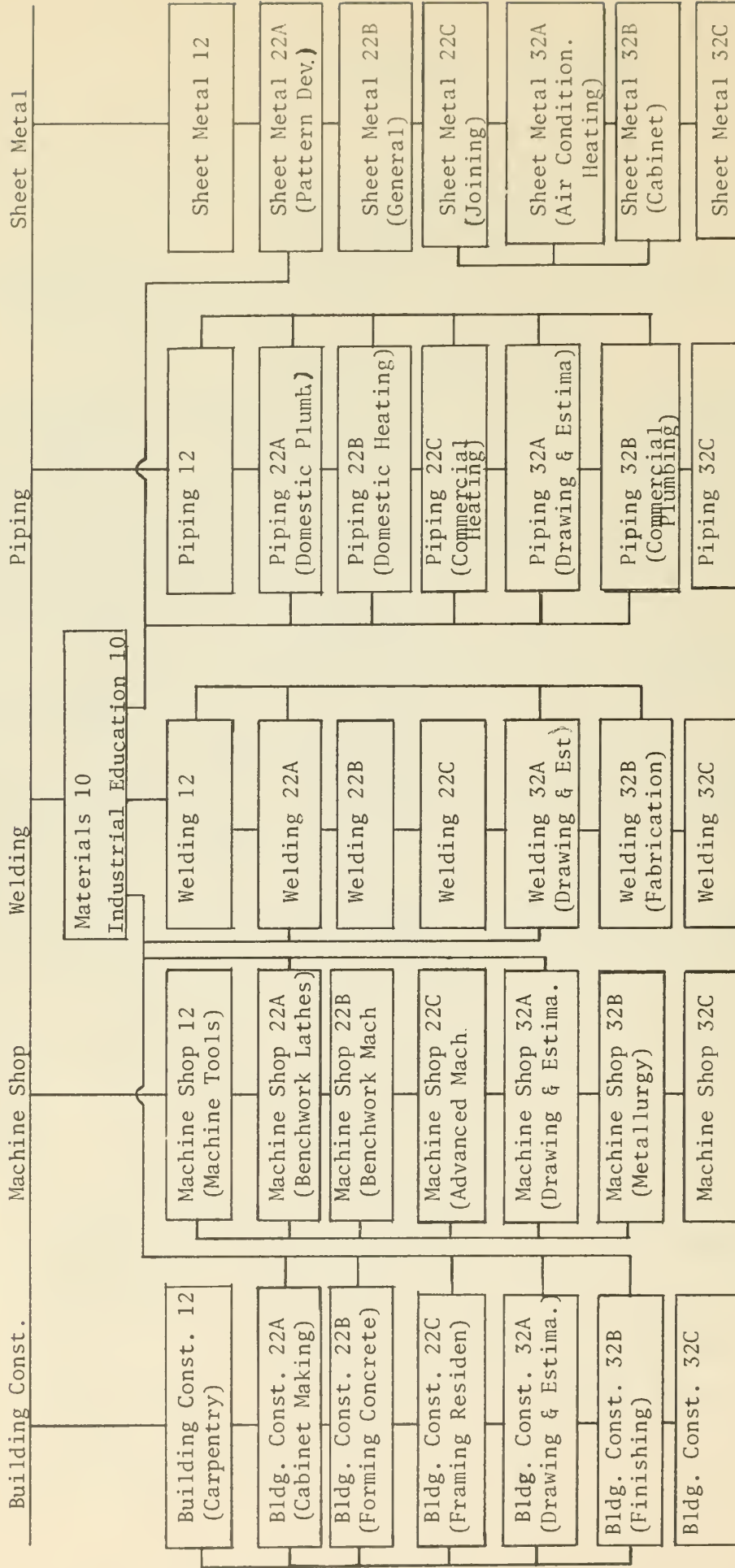


MINORS

Welding	Welding	Drafting	Drafting
Sheet Metal	Drafting	Welding	
Machine Shop	Machine Shop	Machine Shop	
Aircraft Main.	Electricity	Bldg. Const.	
Automotives	Auto Body	Electricity	
	Aircraft Main.	Auto Body	
		Automotives	

Career Field - CONSTRUCTION & FABRICATION

M A J O R S



M I N O R S

Drafting
Electricity
Sheet Metal
Piping
Machine Shop
Welding

Drafting
Welding
Sheet Metal
Bldg. Const.
Piping
Automotives
Auto Body

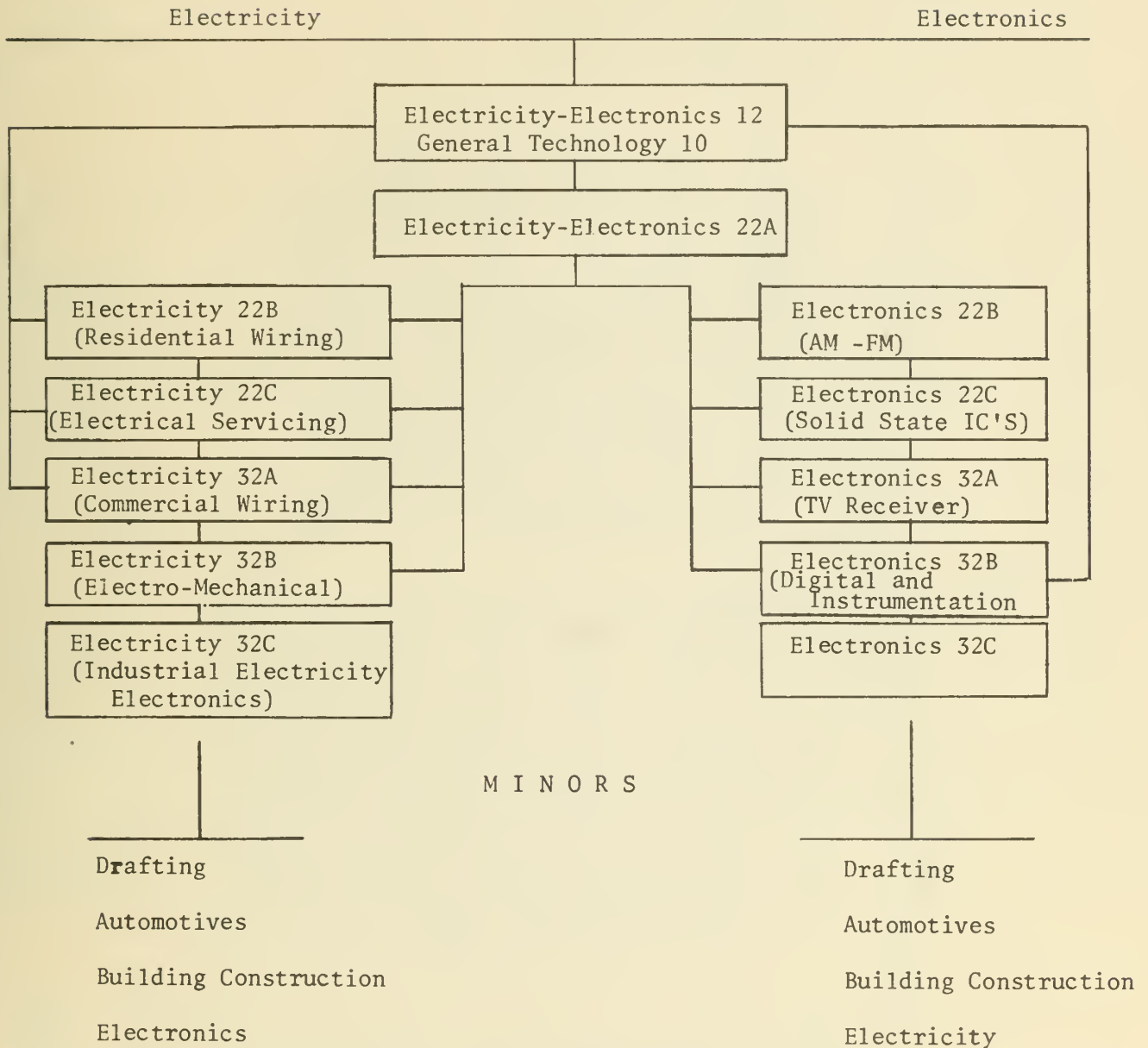
Drafting
Maching Shop
Auto
Auto Body
Sheet Metal
Piping
Building Const.

Drafting
Bldg. Const.
Machine Shop
Welding
Electricity
Sheet Metal

Drafting
Bldg. Const.
Machine Shop
Welding
Piping
Electricity

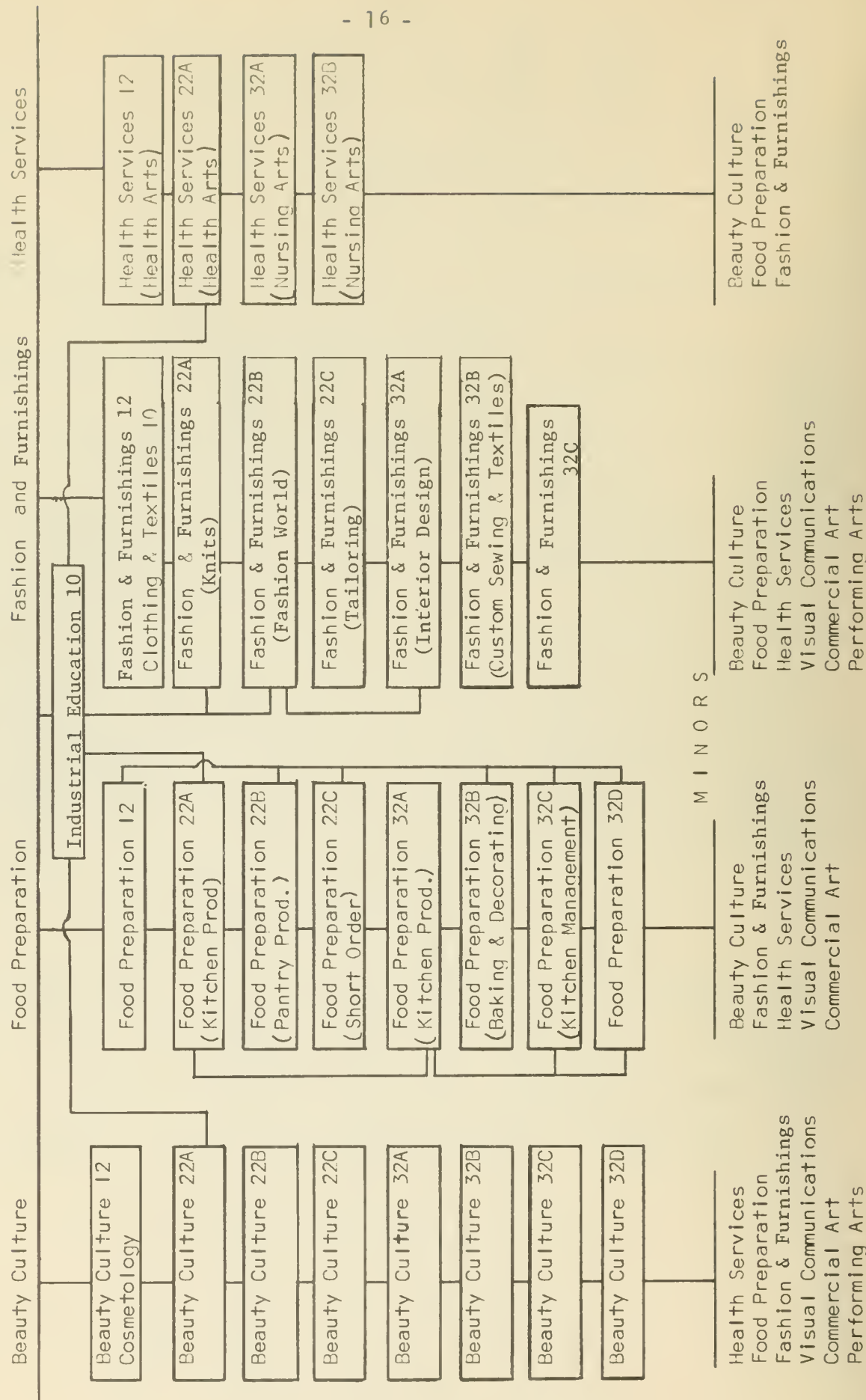
Career Field - ELECTRICITY-ELECTRONICS

M A J O R S



CAREER FIELD - PERSONAL SERVICES

M A J O R S



Career Field - PERFORMING ARTS

MAJORS

Performing Arts

TV

Crafts

Drama 10
or
Performing Arts 12

Performing Arts 22A
(Speech)

T. V. Crafts 22A
(Set and Prop Construction)

Performing Arts 22B
(Movement)

T. V. Crafts 22B
(Lighting)

Performing Arts 22C
(Acting)

T. V. Crafts 22C
(Operation)

Performing Arts 32A
(History)

T. V. Crafts 32A
(Planning and Production)

Performing Arts 32B
(Stage Production)

T. V. Crafts 32B
(T. V. Production)

Performing Arts 32C

T. V. Crafts 32C

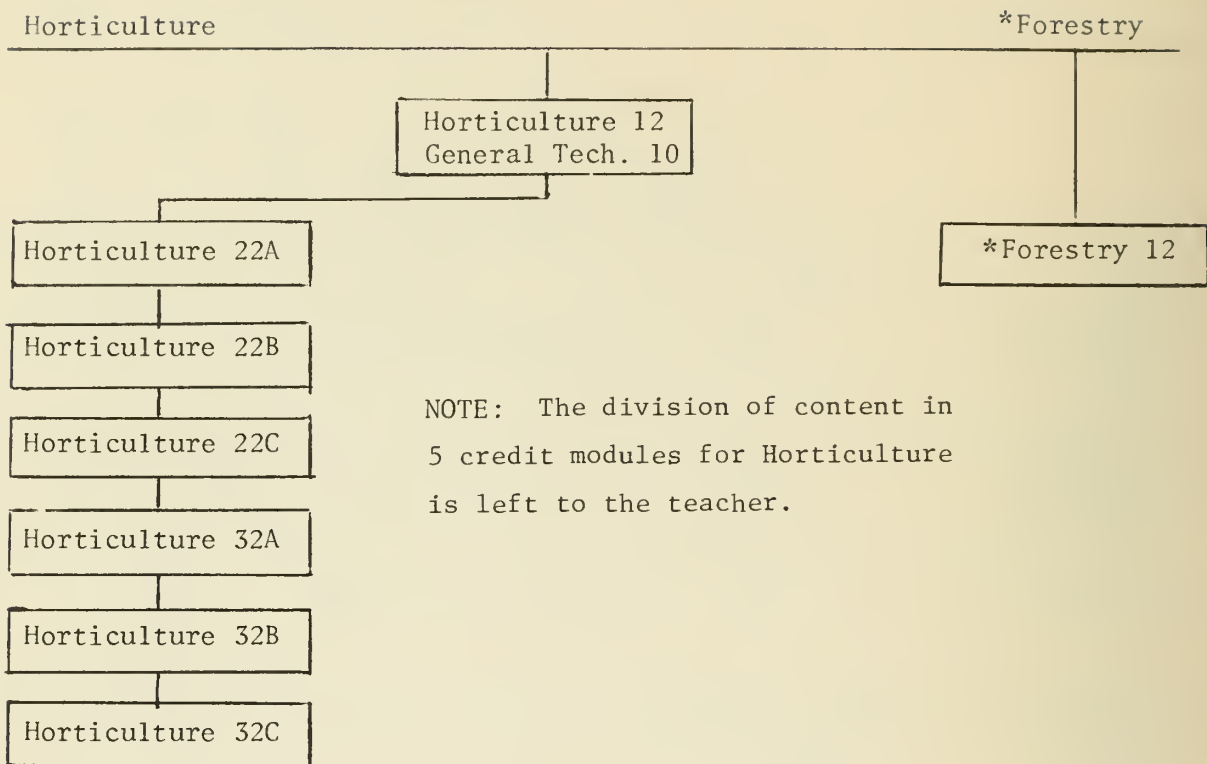
MINORS

T. V. Crafts
Electricity
Drafting
Commercial Art
Fashion and Furnishings
Building Construction

Drafting
Electricity-
Electronics
Building Construction
Commercial Art
Welding
Fashion & Furnishings
Performing Arts

Career Field - HORTICULTURE

M A J O R S



M I N O R S

Drafting

Automotives

*Forestry will be replaced by the course "Land and Life".

B. Articulation

1. Recognition of Alberta Vocational High School Subjects by the Institutes of Technology and Community Colleges

Advance credit may be granted by an institution on the basis of successful completion of a high school vocational program (Business or Technical) and/or obtaining a passing grade on an institution-administered entrance examination.

Because of the necessity of arranging for individualized programs, a student wishing to take advantage of these articulation provisions must write to the Registrar of the Institute of Technology or Community College by April 15, giving details of the high school program completed and stating the post-secondary program he/she is interested in. The institutions involved will communicate with students regarding specific information.

2. Articulation with the Alberta Apprenticeship Program

Some Vocational High School Programs are similar in scope to the junior periods of some apprenticeship programs. In particular, similarities prevail between:

Building Construction and Carpenter Apprenticeship
Electricity and Electrician Apprenticeship
Pipe Trades and Plumber Apprenticeship
Pipe Trades and Steamfitter Apprenticeship
Automotives and Motor Mechanic Apprenticeship
Auto Body and Auto Body Mechanic Apprenticeship
Sheet Metal and Sheet Metal Mechanic Apprenticeship
Machine Shop and Machinist Apprenticeship
Electronics and Radio Technician Apprenticeship
Electronics and Communication Electrician Apprenticeship
Appliance Servicing and Appliance Serviceman Apprenticeship
Related Mechanics and Agricultural Mechanic Apprenticeship
Welding and Welder Apprenticeship
Food Preparation and Cook Apprenticeship
Beauty Culture and Beautifican Certification

a. A person who presents to Apprenticeship authorities of Alberta Advanced Education and Manpower one hundred High School credits, including at least 35 credits in one of the above High School Programs (excepting beauty culture) and an acceptable application for apprenticeship in the corresponding apprenticeship program, may be granted apprenticeship credits on the following basis:

(i) For Building Construction, Electricity, Pipe Trades, Automotives, Auto Body, Sheet Metal, Machine Shop, Electronics - upon recommendation of employer, one year of time credit (3 months shortening of each of four 12-month periods) and First and Second Period Technical credit upon passing the examinations for these periods.

(ii) For Appliance Servicing and Agricultural Mechanics - credits by evaluation of credentials; as "block" apprenticeship training is offered in these trades.

(iii) For Electronics into the Communication Electrician apprenticeship - credits arranged by evaluation of credentials by the trade Advisory Committee, as there are four "craft" areas in the apprenticeship program beyond the first period level.

(iv) For Welding and Food Preparation - upon recommendation of employer, one year of time credit (4 months shortening of each of three 12-month periods) and First Year Technical credit upon passing the First Year examination.

b. A person who presents fewer than 100 High School credits with a minimum of 35 credits in one of the above named Vocational programs, or a person who presents 100 High School credits with fewer than 35 credits in one of the above Vocational programs, may expect to be considered for lesser apprenticeship credit on the basis of individual performance upon undertaking apprenticeship.

c. A person who presents proof of 1,400 hours of scheduled instruction in Beauty Culture in a Vocational High School is eligible for the examination for the Certificate of Proficiency as a Beautician, provided that instruction is given by a certificated Beautician. Persons who complete fewer than 1,400 hours of scheduled instruction may fulfill the requirements in a private Beauty Culture school as a student or in a Beauty Culture salon as a registered apprentice.

NOTE: Information about apprenticeship programs is contained in the Brochure "Apprenticeship Opportunities" - available from the Apprenticeship and Tradesmen's Qualification Regional Offices at:

4th Floor - Princeton Place
10339 - 124 Street
EDMONTON

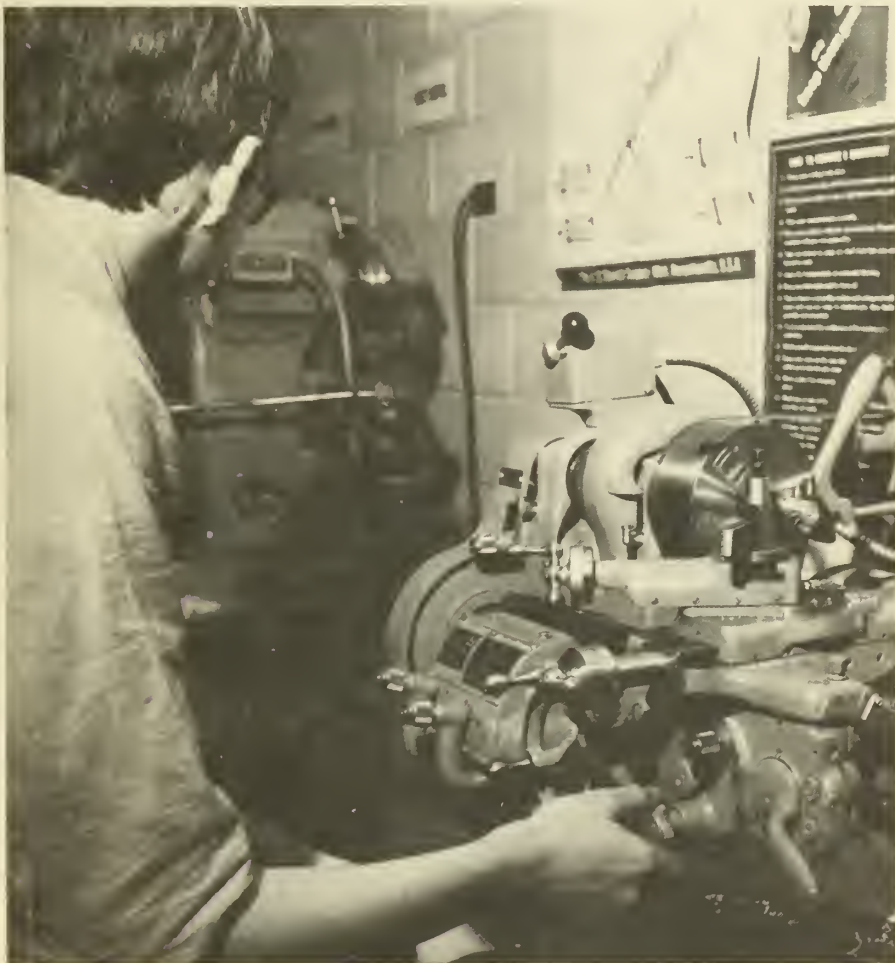
305 Professional Building
4808 - Ross Street
RED DEER

6th Floor - Alberta Place
1520 - Fourth Street S.W.
CALGARY

206 Provincial Building
GRANDE PRAIRIE

Administration Building
Ninth Street and Third Avenue
North
LETHBRIDGE

Offerein Building
9912A Franklin Avenue
FORT McMURRAY



V. DESCRIPTION OF COURSES

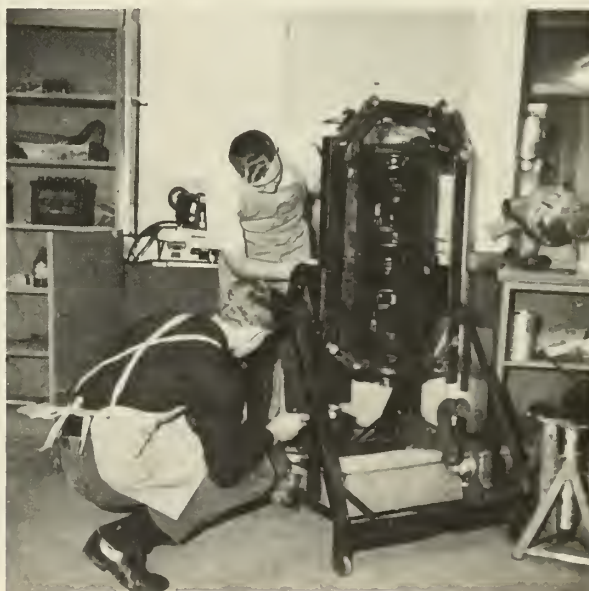
1. INDUSTRIAL EDUCATION 10, 20, and 30

The Industrial Education 10, 20, 30 is a program consisting of sixty one-credit modules. Each module may be taught for a minimum of 25 hours to a maximum of 33 hours. This allows a school some flexibility in organizing a 4-5 credit course utilizing their labs to advantage. Also it provides the necessary time for a student to get the prerequisite for a "22" course by taking two modules of 33 hours each.

The chart on page 8 shows how the modules can be classified into career fields. Programming can be done vertically by selecting modules from single field or horizontally by selecting modules from many fields.

In a multiple activity laboratory, a course will likely consist of modules selected from three or four fields.

The Industrial Education 10, 20, 30 program can be integrated with the "22" program or can be used to provide students with more indepth experiences than were possible through their junior high school orientation program.



A. ELECTRICITY-ELECTRONICS-COMPUTER

1. Electricity

The content of this module introduces the student to basic electrical theory, control of the power of electricity, and basic tool and instrument use.

2. Electronics

In addition to basic theory students will begin to unravel the mystery of electronics by using test instruments and electronic devices.

3. Power Supplies

Using laboratory facilities and time the students will build a power supply to convert AC to DC.

4. Amplifiers

This module will provide the content for students to understand the theory of amplification and to assemble an amplifier.

5. Audio

Students learn about various audio systems and how they are assembled.

6. Servicing

Students will be taught how to use appropriate instruments in a logical sequence to determine apparatus failure.

7. Radio

The students should become familiar with the actual workings of radio system(s) through practical activities.

8. Television

The students should become familiar with the actual workings of a television system(s) through practical activities.

9. Logic Circuits

This module will help the students progress from basic concepts of digital electronics to the more sophisticated circuitry by actual hands-on involvement.

10. Computer

This module will give the students an introductory course in computer organization, operation and programming.

11. Electric Wiring

The students will be taught basic wiring circuits so that they can properly terminate various devices normally found in residential wiring.

12. Design and Construction

This module will give the students the opportunity to study the importance of planning, organization and quality control as they assemble their own project from their own layout.



B. MATERIALS

1. General Woods

Content includes the safe use of tools and basic shaping and joining of wood.

2. Building Construction 1

Simple framing and safe tool use are studied and practiced.

3. Building Construction 2

The Canadian code is applied to construction. The correct procedures for building a house from basement to roof are studied.

4. Cabinet 1

Safe use of tools and equipment is taught while performing exercises in shaping and joining parts of wood projects. Basic joining is practiced.

5. Cabinet 2

Content includes procedures and practices used in building box furniture, kitchen cabinets and finishing methods.

6. General Metals

This module provides students with exploratory experiences in a number of metal forming and fabricating processes. Both hand and machine tools are used.

7. Sheet Metal

Students learn how to make simple layouts, the use of shearing tools, forming methods and how to assemble and fasten the parts of sheet metal projects.

8. Machine Shop

This module introduces the student to the machine lathe, drill, grinder and shaper. Correct procedures are taught for setting up and making basic cuts.

9. Welding Arc

Students learn how to set the welder for various type of rods and metal weights. Basic techniques and welding forms are practiced.

10. Welding Gas

The content includes safe procedures for setting up the equipment and making adjustments. Basic oxy-acetylene procedures and techniques are practiced.

11. Foundry

This module will give the student an opportunity to try the different processes involved in foundry from pattern making to finishing a casting.

12. Plastics 1

The first module in plastics deals with cutting, finishing and assembling plastic products as well as the construction of molds and using them to form plastics.

13. Plastics 2

The second module in plastics deals with plastics forming and fabricating techniques as they relate to the plastics industry.

14. Earths-Ceramics

Students learn about the manufacture of clay products and practice forming clay products using both hand and molding procedures.

15. Earths-Concrete

Students learn about the mixing of concrete and forming methods, They practice placing, finishing, curing, reinforcing and coloring concrete.

16. Textiles

Students will learn how to select fabrics for various purposes; how to select and care for clothing and how to construct several simple projects from fabrics.

17. Foods

Students learn about safety and sanitation in the kitchen; how to prepare a simple meal and the principles of meal preparation with reference to nutrition and costs.

C. POWER TECHNOLOGY MODULES

1. Conventional Heat Engines

Students study and operate several internal and external combustion engines to learn about safety procedures, efficiency, control and energy utilization.

2. Small Engine Tune-Up and Troubleshooting

Students work with small engines learning about basic operating principles, tool use, adjustments and minor repairs.

3. Small Engine Overhaul

This is a continued study of small engines. Proper procedures for troubleshooting, systems analysis and component replacement are taught.

4. Automobile Care

This module covers the major systems in the automobile, safety, insurance, maintenance, and environmental and social implications.

5. Automobile Tune-Up

Students identify engine parts and use tools and instruments to tune up an engine. Ignition and carburation are studied.

6. Mechanical Systems

This module provides the student with the experience of dismantling and re-assembling various mechanical systems to determine operating principles.

7. Electro-mechanical Controls and Troubleshooting.

Students study conversion and control of energy as it applies to electric starters, generators and alternators. Safety and problem solving techniques are stressed.

8. Electrical Systems

Content includes the production of electricity, amplification control and transmission. Ignition of both single cylinder and multiple engines will be studied.

9. Non-Conventional Power Sources

Other sources of energy such as solar, chemical, wind etc. are studied.

10. Appliance Repair and Troubleshooting

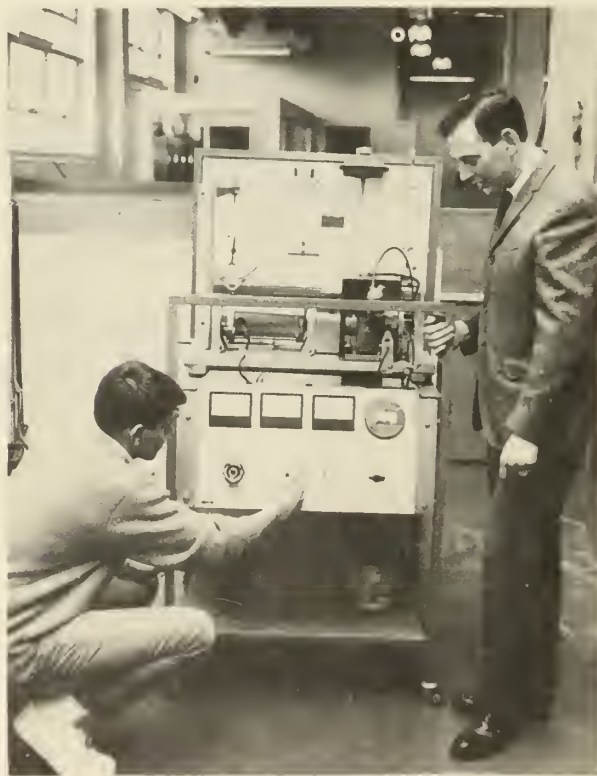
Students will learn troubleshooting procedures as they repair typical appliance faults.

11. Hydraulics and Fluidics

Students will assemble, operate and analyze different hydraulic systems and learn about efficiency of energy transfer.

12. Pneumatics and Fluidics

Students design a simple logical control system and assemble, operate and analyze several different pneumatic systems.



D. VISUAL COMMUNICATIONS MODULES

1. Principles of Lithography

Content includes basic principles of the lithographic process, simple layouts, making masters and offset press operation.

2. Line Photography

Students use the process camera to do line photography and prepare orthochromatic film to make metal masters.

3. Black and White Photography

Content includes the study of cameras, light sensitive materials and enlarger work.

4. Color Photography

Students study principles of color photography, properties of color film and techniques of development.

5. Screened Photography

This is a continued study of process camera operation, stripping and platemaking. The module on line photography should precede this one.

6. Layout and Design

Students will develop skill in layout and commercial art techniques.

7. Offset Printing Production

Students plan a production run of a printed product and in the process learn about: systems analysis, quality control, offset production, deadlines, wastage and consumer acceptance.

8. Mechanical Drafting

Basic drawing concepts are introduced to produce product representations through various projection methods. Students learn to use and take care of instruments.

9. Topographical Drafting

Students draw contour maps and learn how to use various projections and how to do dimensioning.

10. Architectural Drawing

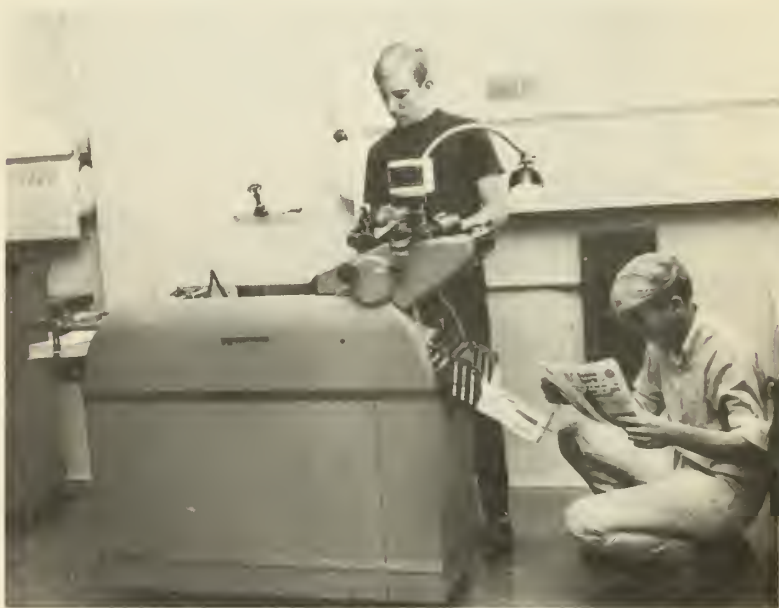
This module introduces the student to reading and drawing building plans. Housing standards are studied.

11. Relief Printing

Principles of relief printing will be studied and applied to hand setting type and the use of a small platen press, sign press and rubber stamp machine.

12. Printmaking Techniques

Students will learn how to handcut prints as well as use the photographic process for making prints. They will learn how to construct and use their own equipment.



E. GENERAL MODULES

1. Research

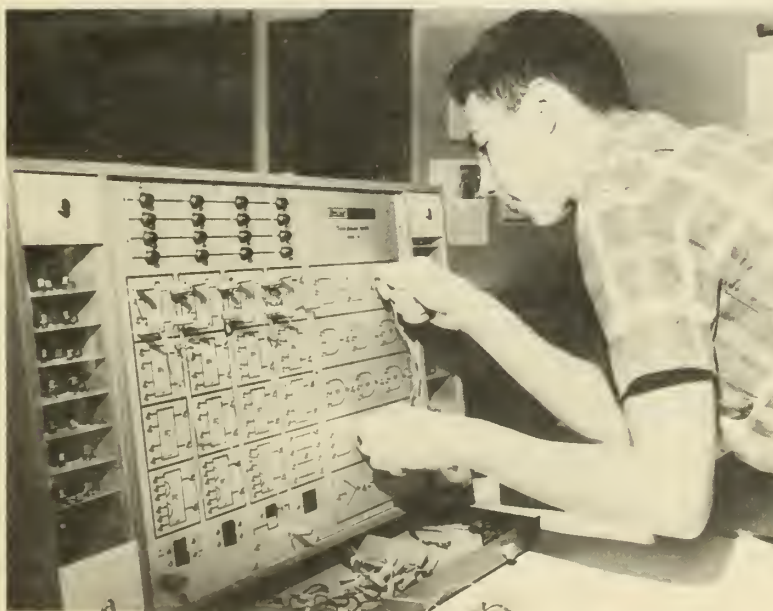
The research module is intended for individual student use. It provides a 25 hour module to allow a student to expand on an interest related to the Industrial Education program.

2. Developmental

Content in Industrial Education is constantly changing. This module is intended for teachers' use in developing new areas of knowledge not attended to by the current curriculum in Industrial Education. Teachers intending to develop and experiment with new content should discuss this with one of the provincial Industrial Education Consultants before exposing students to it.

3. Production Science

This module provides a 25 hour block of time to set up a simulated industrial experience. The concepts can be drawn from the Production Science 30 course which is a much expanded version of the same processes.



2. INDUSTRIAL EDUCATION 12, 22, 32 COURSE DESCRIPTIONS

A. VISUAL COMMUNICATIONS

The career field of Visual Communications includes: drafting, graphic arts and commercial art. Students may build a program by selecting appropriate modules from the various areas or concentrate on one.

a. Drafting

(i) Drafting 12 (1864)

An introductory course which develops basic skills in the use and care of instruments, sketching, lettering, pictorial drawing, orthographic drawing, dimensioning and career information.

(ii) Drafting 22A (Machine Drawing) (2864)

The course concentrates on machine drawing, shape descriptions, fastening methods and working drawings.

(iii) Drafting 22B (Architectural Drawing) (2865)

An introduction to architectural drawing dealing with design, materials, building standards and working drawings.

(iv) Drafting 22C (Topographical Drawing) (2866)

This course in topographical drawing introduces the students to surveying, photogrammetry, interpretation of field notes and photographs, map drawing, symbols and map projections.

(v) Drafting 32A (Engineering Graphics) (3864)

Engineering graphics develops the concepts learned in machine drawing (22A). Activities include multi-view drawings, auxiliary views, descriptive geometry, vector geometry, industrial systems, power transmission systems, and white printing.

(vi) Drafting 32B (Architectural Drawing) (3865)

This is the second course in architectural drawing with emphasis on the design of light commercial facilities.

(vii) Drafting 32C (3866)

This course consists of content taken from related fields such as construction and fabrication to provide the student with practical activities related to his drafting.

b. Graphic Arts

(i) Visual Communications 12 (1736)

Visual Communications is a course common to the three major areas in the career field. Students will learn about occupational opportunities, basic drawing, composition and design, color theory, lettering, advertising layout, photography, platemaking, printing and finishing procedures.

(ii) Graphic Arts 22A (Duplication and Reproduction) (2904)

The course explores the areas of offset printing, platemaking, photography, silkscreening, and binding techniques.

(iii) Graphic Arts 22B (Offset Line and Half-tone) (2905)

In this course advanced work is done: lithography, photography, copy preparation, film processing, plate making and offset printing.

(iv) Graphic Arts 22C (Letterpress) (2906)

The course includes: layout work for printing, letterpress printing and bindery.

(v) Graphic Arts 32A (Advanced Letterpress and Offset) (3904)

Advanced work is performed in design, make up, production and bindery operations.

(vi) Graphic Arts 32B (Production Technology) (3905)

Students use all the experiences gained through previous work to organize and operate as a small printing industry. They will learn about the interdependence of men, machines and materials, division of labor, personnel organization, research and development, and the problems faced by people in an actual production operation.

(vii) Graphic Arts 32C (3906)

Through this course students may increase their competencies in areas covered previously, or engage in actual graphic arts work in industry under the supervision of the Graphic Arts teacher and a journeyman on the job.

c. Commercial Art

(i) Visual Communications 12 (1736)

Visual Communications is a course common to the three major areas in the career field. Students will learn about occupational opportunities, basic drawing, composition and design, color theory, lettering, advertising layout, photography, platemaking, printing and finishing procedures.

(ii) Commercial Art 22A (General Illustration) (2848)

An introduction to drawing and illustration as applied to commercial assignments. The course includes constructive drawing (forms, perspective etc.), expressive drawing (mature studies, human form etc.) and an introduction to various painting techniques.

(iii) Commercial Art 22B (Information Design) (2849)

An introduction to the elements and principles of design as applied to two-dimensional design such as advertising layout and lettering.

(iv) Commercial Art 22C (Design 3D) (2850)

The content of this module stresses the techniques of advertising, design, lettering and merchandising.

(v) Commercial Art 32A (Commercial Illustration) (3848)

This course is a continuation of 22B with more advanced study of drawing and illustration in three-dimensional design using various materials to create models for display on commercial assignments.

(vi) Commercial Art 32B (Production Technology) (3849)

Students use all the experience gained through previous work to organize and operate a small advertising firm. They will learn about the problems of labor, personnel organization, marketing and the actual production operation.

(vii) Commercial Art 32C (3850)

Through this course students may increase their competencies in areas covered previously by doing additional work in the school or by engaging in actual art work for a commercial firm. Students must be under the supervision of the Commercial Art teacher and a craftsman on the job.

B. MECHANICS

The career field of Mechanics includes automotives, auto body, aircraft maintenance and related mechanics. Students may build a program by selecting modules from one or more of the areas.

a. Auto Body

(i) Auto Body 12 (1816)

An introductory course which includes activities in occupation and safety studies, use of tools and processes in body work, welding and painting.

(ii) Auto Body 22A (2816)

Activities include estimating damage, alignment, welding and metal finishing.

(iii) Auto Body 22B (2817)

Students learn to use terms of the trade, explain operations, examine shop design, do more advanced work in alignment, jacking, welding and door repairs.

(iv) Auto Body 22C (2818)

Management problems are studied. Activities include: metal cutting, brazing, welding, bumper repair, frame repair, repairing dents and painting (practice panel).

(v) Auto Body 32A (3816)

Advanced work is done in assessing damage, writing up estimates, spray painting, fitting components and metal finishing.

(vi) Auto Body 32B (3817)

Advanced work is continue in management, painting, frame alignment and welding.

(vii) Auto Body 32C (3818)

Students may increase their skills by shop practice in the school or on the job training in an auto body shop. The student must be supervised by the Auto Body teacher as well as by a journeyman on the job.

b. Automotives

(i) Mechanics 12 (1746)

Mechanics 12 is an introductory course leading to all the major areas in the career field of mechanics. Students are introduced to power sources and methods of transmission. They study the concepts of work, energy and power and engage in the activities of testing, disassembly and assembly of machines, reading, research and applying information learned to analyzing and repairing minor engine problems.

(ii) Automotives 22A (Power Systems) (2824)

This course combines theory and practice in the maintenance and repair of the internal combustion engine. Activities include procedures in problem analysis, disassembly, repair and assembly.

(iii) Automotives 22B (Power Train) (2825)

Theory, practice and service are studied as related to the power train components of clutches, transmission, drive line, rear axle, and introduction to automatic transmission.

(iv) Automotives 22C (Alignment and Brakes) (2826)

Theory and service are practiced as related to wheel alignment, brakes, tires and shock absorbers.

(v) Automotives 32A (Fuel and Tune-up) (3809)

This course is a study of the fuel, ignition and exhaust systems, their components, analysis and tune-up.

(vi) Automotives 32B (Electrical Systems) (3810)

Theory includes basic electricity and magnetism, sources of electrical energy and its application to the automobile.

(vii) Automotives 32C (3811)

Students may increase their competencies in any of the major areas of study previously taken by more school shop practice or may train on the job under the supervision of the Automotives teacher and a journeyman.

c. Aircraft Maintenance

(i) Mechanics 12 (1746)

Described under Automotives, page 36.

(ii) Aircraft Maintenance 22A (2804)

Basic aeronautical theory, aircraft woodwork, fabric covering, aircraft metals and plastics are studied and practiced.

(iii) Aircraft Maintenance 22B (2805)

The course includes: aircraft sheet and bench metal work, welding.

(iv) Aircraft Maintenance 22C (2806)

The course includes: flight controls and rigging, weight and balance, and aircraft systems (fuel, oxygen, ventilation, de-icing, pressurization, hydraulics, brakes).

(v) Aircraft Maintenance 32A (3804)

Aircraft power plants, propellers and electrical systems are studied.

(vi) Aircraft Maintenance 32B (3805)

The course includes: aircraft engine overhaul and testing, inventory and records, overhaul manual.

(vii) Aircraft Maintenance 32C (3806)

Advanced work may be done in the school shop on topics covered previously or the student may train on the job under the supervision

of the Aircraft Maintenance teacher and a journeyman at the place of work.

d. Related Mechanics

Related Mechanics is a program designed to meet the needs of students planning careers in the agricultural sector of the Alberta economy. Entry into the program is through Mechanics 12 or Industrial Education 10.

(i) Mechanics 12 (1746)

Described under Automotives, page 36.

(ii) Related Mechanics 22A (Power Systems) (2809)

This course combines theory and practice in the maintenance and repair of the internal combustion engine.

(iii) Related Mechanics 22B (Building Construction) (2810)

A study is made of materials and methods of construction used for erecting frame buildings such as a granary, barn, garage or house. Activities include the use of hand and power tools in the construction of a frame building.

(iv) Related Mechanics 22C (Electricity) (2811)

This course is a study of the theory and application of electricity to residential wiring.

(v) Related Mechanics 32A (Machine Shop) (3809)

Students will learn to use the basic machine and hand tools required to shape metal as required in the repair and maintenance of farm machinery.

(vi) Related Mechanics 32B (Welding) (3810)

This course includes the theory and practice of both oxycetylene and electric arc welding.

(vii) Related Mechanics 32C (3811)

Advanced study may be continued of any of the topics covered in the courses listed under related mechanics or on the job training under the supervision of the Related Mechanics teacher and a journeyman on the job.

C. CONSTRUCTION AND FABRICATION

The career field of Construction and Fabrication includes: building construction, machine shop, welding, piping, and sheet metal.

a. Building Construction

(i) Building Construction 12 (Carpentry) (1836)

This introductory course provides theory and practice in the use of hand and power tools, planning and design, and materials. Students will have an opportunity to make projects related to the theory.

(ii) Building Construction 22A (Cabinet Making) (2836)

This is a course in cabinet and furniture construction. The theory and practice emphasize design, materials, tools and processes.

(iii) Building Construction 22B (Concrete and Form Construction) (2837)

The course deals with concrete as a material of construction and relates theory to practice in design, form construction and concrete replacement.

(iv) Building Construction 22C (Residential Framing) (2838)

The course outlines the theory and practices used in framing a house. Students may frame a small building.

(v) Building Construction 32A (Sketching, Blueprint Reading and Estimating) (3836)

The course provides a detailed list of activities in sketching, drawing, describing and estimating the costs of materials, labor and overhead in constructing a building.

(vi) Building Construction 32B (Exterior and Interior Finishing) (3837)

The course provides theory and practice in selecting materials, tool use, design and construction methods for windows, doors, roof, eaves, interior and exterior trim, stair construction and finishing with paints and varnishes.

(vii) Building Construction 32C (3838)

Students may pursue any of the topics in previous courses in greater depth or take further training on the job under the supervision of the Building Construction teacher and a journeyman.

b. Machine Shop

(i) Machine Shop 12 (1936)

The course provides theory and practice in: layout and bench work, operation of the lathe, shaper, drill press, power saw and grinder. It gives an introduction to metallurgy.

(ii) Machine Shop 22A (Benchwork, Lathe) (2936)

This course provides theory and practice in the safe use of hand tools, lathe, drill press and grinder to shape metal by removal.

(iii) Machine Shop 22B (Benchwork, Machines) (2937)

This course continues from the experience in 22A with the theory and practice of advanced lathe work, the introduction of the milling machine and shaper.

(iv) Machine Shop 22C (Advanced Machinery) (2938)

Content and practice advance to precision measuring and machining, cutting threads, tapers, keyways, gear cutting and heat treating.

(v) Machine Shop 32A (Drawing, Sketching and Blueprint Reading) (3936)

Students are given theory and practice related to the use of drawing instruments, orthographic and oblique projections, freehand sketching and obtaining technical information.

(vi) Machine Shop 32B (Metallurgy) (3937)

This course provides theory and practice in metal identification, composition, production and metalworking processes.

(vii) Machine Shop 32C (3938)

Students may pursue any of the topics listed in greater depth or take further training on the job under the supervisor of the Machine Shop teacher and a journeyman on the job.

c. Welding

(i) Welding 12 (1980)

The course deals with occupational information, safety, and the theory and practice of arc and oxyacetylene welding.

(ii) Welding 22A

Practice is given in both oxyacetylene and electric arc welding utilizing exercises, repair work and projects.

(iii) Welding 22B (2982)

A continuation of skill development.

(iv) Welding 22C (2982)

Advanced work is given in special electric arc applications such as welding non-ferrous metals, hard surfacing and specialty welding.

(v) Welding 32A (Drawing, Estimating, and Metallurgy) (3980)

Basic drafting techniques are practiced as they relate to welding and the properties, classification and testing of metals studied.

(vi) Welding 32B (Fabrication and Repair)

The course emphasizes design, fabrication and repair.

(vii) Welding 32C (3982)

Students may develop skills at the school through in-depth studies or engage in training on the job in a welding shop under the supervision of the Welding teacher and a journeyman welder.

d. Piping

(i) Piping 12 (1949)

The course gives theory and practice in safety measurement and layout, joining pipe, fittings and valves. Occupational opportunities and qualifications are studied.

(ii) Piping 22A (Domestic Plumbing) (2949)

The course gives the theory and practice necessary to plumb a house.

(iii) Piping 22B (Domestic Heating) (2950)

The course consists of the study of hot water heating, installing gas lines and servicing gas controls.

(iv) Piping 22C (Commercial Heating) (2951)

Systems used in commercial heating and methods of installation are studied.

(v) Piping 32A (Shop Drawing, Sketching, Estimating and
Reading Blueprints) (3949)

Plans for a plumbing installation are drawn using correct lines and symbols complete with the estimate of the cost.

(vi) Piping 32B (Commercial and Industrial Plumbing) (3950)

The course relates theory and application of the plumbing code to roughing in and setting the fixtures on a job.

(vii) Piping 32C (3951)

Advanced work on topics covered may be continued in the school shop or the student may engage in training on the job under the supervision of the Piping teacher and a journeyman.

e. Sheet Metal

(i) Sheet Metal 12 (1968)

Sheet Metal 12 is an introduction to the career of sheet metal worker, qualifications required and work organization. Theory and practice is given in layout, cutting, forming and pattern development.

(ii) Sheet Metal 22A (Pattern Development) (2968)

This course emphasizes the theory and application of the principles of sheet metal layout.

(iii) Sheet Metal 22B (General Sheet Metal Work) (2969)

The fabrication of rectangular, cylindrical and conical objects provide the activities of this course.

(iv) Sheet Metal 22C (Joining) (2970)

Content includes: mechanical joining methods, adhesive and cohesive methods, with practice in all.

(v) Sheet Metal 32A (Air Conditioning and Residential Heating) (3968)

A complete study is made of an air conditioning and a heating system.

(vi) Sheet Metal 32B (Cabinet Work) (3969)

Students fabricate furniture or fixtures made of sheet metal.

(vii) Sheet Metal 32C (3970)

Advanced work may be engaged in at the school or a student may train on the job under the supervision of the Sheet Metal teacher and a journeyman in the trade.

D. ELECTRICITY - ELECTRONICS

The career field of Electricity - Electronics includes electricity and electronics. Students may select courses from either area, within the restraints of prerequisites to build a program.

a. Electricity - Electronics

(i) Electricity - Electronics 12 (1731)

This course introduces concepts basic to the whole field of electricity - electronics. It deals with: occupational information, safety, nature of electricity, magnetism and electric-magnetism, electrical measurement, circuitry and electrical systems.

(ii) Electricity - Electronics 22A (2880)

This course provides basic theory necessary for advanced work in electricity and electronics. Topics include: alternating voltage and current, inductance, capacitance, circuitry, semi-conductors, transistors and power supplies.

b. Electricity

(iii) Electricity 22B (Residential Wiring) (2881)

The course deals with the theory and skills required to wire a house. The content includes basic electrical theory, code requirements, house circuitry, tool usage, and practice in wiring a building.

(iv) Electricity 22C (Electrical Servicing) (2882)

This course includes content on service equipment and tools, troubleshooting techniques, service procedures and practice in appliance repairing.

(v) Electricity 32A (Commercial Wiring) (3880)

Content of this course includes: drawing plans for electric wiring, wiring methods, wiring hardware, tool and equipment use, control equipment and practical experience in all phases of commercial wiring.

(vi) Electricity 32B (Electro-Mechanical) (3881)

Course content includes theory of and practice with: generators, A.C. and D.C. motors and transformers.

(vii) Electricity 32C (3882)

Students may increase their competencies in areas covered previously in the Electrical program or engage in electrical work in industry by means of a program co-ordinated by the Electricity teacher and under the supervision of a journeyman on the job.

c. Electronics

(iii) Electronics 22B (AM-FM) (2889)

This course consists of theory, application and practice related to radio transmission and reception which includes: power supplies, detectors, amplifiers, AM and FM equipment, components, test equipment and a study of an operating transmission and reception system.

(iv) Electronics 22C (Solid state and i.c. devices) (2890)

The course content includes a review of transistors, a study of integrated circuits and solid state devices.

(v) Electronics 32A (T.V. Receivers) (3888)

Course content includes: occupational information, T.V. signal transmission, T.V. Circuitry, video signal and picture reproduction, antennas, trouble shooting and servicing a T.V. receiver.

(vi) Electronics 32B (Digital Logic and/or Instrumentation) (3889)

Course content includes: binary arithmetic, codes, logic circuits and study of the practical computer, and/or the instrumentation portion of the course deals with the theory and practice of electrical and electronic measuring instruments. Content may be skewed to the interests of the students and the equipment available.

(vii) Electronics 32C (3890)

The content of this module may be used to expand on topics studied in previous modules. Studies may include industrial electronics, color T.V. or others as appropriate to the situation.

E. PERSONAL SERVICES

The career field of Personal Services includes beauty culture, food preparation, fashions and fabrics and health services. Students may build a program for career development by selecting courses from the various fields within the constraints of prerequisites or concentrate on one major.

a. Beauty Culture

(i) Beauty Culture 12 (1832)

The course provides occupational information and theory and practice as it relates to the following topics: care and maintenance of equipment, personal hygiene, hairstyling, manicuring, personality development.

(ii) Beauty Culture 22A (2832)

Course content includes: hairstyling, setting, work organization, facials and make-up, scalp treatment, shampoos, public hygiene and customer work.

(iii) Beauty Culture 22B (2833)

Course content includes: physiology, anatomy, skin and scalp, facial treatments, cold waving, hair coloring, advanced hairstyling, hair cutting and practice work.

(iv) Beauty Culture 22C (2834)

The content of this course expands on the topics listed in 22B with an emphasis on practical application.

(v) Beauty Culture 32A (3832)

Course content includes: permanent hair coloring, hair bleaching, fashion cuts and styles, pedicuring, salesmanship and shop management.

(vi) Beauty Culture 32B (3833)

The course gives practice in advanced work in hairstyling with emphasis on workmanship, making decisions as to suitability, and practice in salesmanship and management.

(vii) Beauty Culture 32C and D (3834 and 3835)

The emphasis of these courses is customer service, skill development and competency in dealing with customers.

b. Food Services

(i) Food Preparation 12 (1896)

The course content outlines the opportunities in the food service industry, provides instruction in the use of cooking equipment, safety, sanitation, nutrition, menu planning and practical cookery.

(ii) Food Preparation 22A (Kitchen Production) (2896)

The course content includes: vegetable cookery, stocks, soups, sauces, gravies, meats and desserts.

(iii) Food Preparation 22B (Pantry Production) (2897)

Contents of the course include: production of sandwiches and garnishes, salads and appetizers.

(iv) Food Preparation 22C (Short Order) (2898)

The course provides experiences in the preparation of beverages, eggs; utilization of dairy products, breakfast foods, and menus.

(v) Food Preparation 32A (Kitchen Production) (3896)

Students become involved in commercial type cooking operations and serving the public. Emphasis is placed on meat, fish, poultry, soups and salads.

(vi) Food Preparation 32B (Baking and Decorating) (3897)

Content relates to: baking ingredients, cakes, pastries and yeast doughs, desserts and decorating.

(vii) Food Preparation 32C (Kitchen Management)

Content includes: management, nutrition, purchasing, planning, costing and serving food. Part of the time may be spent in a commercial establishment.

(viii) Food Preparation 32D (3899)

Students may concentrate on special interest areas related to previous modules and/or work in a commercial food outlet under the supervision of the Food Preparation teacher.

c. Fashion and Furnishings

(i) Fashion and Furnishings 12 (Quick and Easy Sewing) (1861)

In this introductory course students will be introduced to career fields in clothing, how to plan a wardrobe, learn about the various fabrics, use patterns and sewing machines.

(ii) Fashion and Furnishings 22A (Knits) (2861)

The content of this module includes the use, sewing and care of knits.

(iii) Fashion and Furnishings 22B (Fashion World) (2862)

The principles and elements of design, fashions, modelling, consumerism, merchandising, and the production of projects make up the study and activities of this module.

(iv) Fashion and Furnishings 22C (Tailoring) (2863)

Content includes: fabrics for tailoring, fitting and alterations, sewing techniques and use of accessories.

(v) Fashion and Furnishings 32A (Interior Design) (3861)

Content includes: principles and elements of design as related to fabrics used in the home, and projects dealing with window dressing, upholstery and table linen.

(vi) Fashion and Furnishings 32B (Custom Sewing and Textiles) (3862)

Content includes a study of career opportunities, management, merchandising, cleaning methods and commercial projects.

Alternate

Students may select a methodology known as Production Technology to achieve the objects of 32B. Content would include:

An introduction to industry, the division of labour, personnel organization, research and development, a simulated production experience and the impact of technology on the textile industry and its workers.

(vii) Fashion and Furnishings 32C (3863)

Students may concentrate on special interest areas related to previously completed modules and/or work in a commercial sewing establishment under the supervision of the Fashion and Furnishings teacher.

d. Health Services

The Health Services program consists of a total of 20 credits. Students may couple this program with Business Education courses to develop a career field.

(i) Health Services 12 (1961)

The content of this module is designed to introduce students to the various occupational areas in the health field as well as a study of home nursing. First aid is a vital part of the program.

(ii) Health Services 22 (2961)

This module deals with health care centres, assistants, anatomy and physiology, nursing practices, disease identification and safety practices.

(iii) Health Services 32A (3961)

Course content includes: nursing assistant preparation, problems of patients, the working environment, nutritional needs and anatomy and physiology.

(iv) Health Services 32B (3962)

Content includes: introduction to institutional services, communications, anatomy and physiology, human growth, patient care and special patients.

F. PERFORMING ARTS

The career field of Performing Arts includes Performing Arts and Television Crafts. Modules from either area may be selected to give students the option of developing competencies in one of three areas: performance, stage technology or radio/television operations.

a. Performing Arts

(i) Performing Arts 12 (1944)

This module is designed to give students an insight into the various aspects of work on stage and in television. Activities include the use of tools for building stage props, staging procedures and television procedures.

(ii) Performing Arts 22A (Speech) (2944)

Content includes: theatre speech, interpretation of prose and poetry, dialects, and performing.

(iii) Performing Arts 22B (Movement) (2945)

This module includes: stage technique, creative movement and dance, fencing and pantomime.

(iv) Performing Arts 22C (Acting) (2946)

Students will do script analysis, character analysis, perform exercises in improvisation, do radio and T.V. acting, do stylistic acting and learn about makeup.

(v) Performing Arts 32A (History) (3944)

Module content includes: development of playwriting, history of costumes, and the development of theatre operations.

(vi) Performing Arts 32B (Stage Production) (3945)

The gist of this module is the production of a one act play through which experiences will be gained in acting, directing, house and crew management.

(vii) Performing Arts 32C (3946)

This module is unstructured in order to give the student time to engage in in-depth study of a topic previously started or work in the field of performing under the direct supervision of the teacher.

b. Television Crafts

(i) Performing Arts 12 (1944)

This course is common to both Performing Arts and Television. It provides an introduction to the experiences found in these two career areas.

(ii) Television Crafts 22A (Set and Property Construction) (2972)

Course content includes learning to use carpenter's tools, properties of materials for construction and types of scenery.

(iii) Television Craft 22B (Lighting) (2973)

Lighting in television and stage is studied to give technical and artistic knowhow. Students will learn about the elements of lighting, the equipment use and control for both television and stage productions.

(iv) Television Crafts 22C (Studio Operations) (2974)

Course content deals with studio and control room operations: basic electronics, cameras, lenses, video and audio equipment, special effects and VTR techniques.

(v) Television Crafts 32A (Planning Production) (3972)

Students will, in the course of this module, learn to write and produce a television show.

(vi) Television Crafts 32B (Television Production) (3973)

Course activities consist of a wide variety of studio and control room jobs.

(vii) Television Crafts 32C (3974)

With the time available in this module students may expand upon some interest area stimulated in their previous course work or undertake a project in the field of television under the direct supervision of the teacher.

G. HORTICULTURE

a. Horticulture 12, 22, 32

The Horticulture program is limited to very few schools. The curriculum content may be selected from the course guide dated 1967 and taught in modules of five credits each.

b. Land and Life 10, 20, 30

While Land and Life is not in the vocational series it is a course dealing with elements of Horticulture, Agriculture and Forestry.

3. COURSES RELATED TO INDUSTRIAL EDUCATION

a. Production Science 30 (5 credits) (3729)

Students learn about the organizational structure of industry, production processes and the various problems encountered in producing a salable product or service.

b. Work Experience 25 and 35 (2998 and 3998)

Each of the two Work Experience Education courses consists of 125 hours of time. Students are given some formal lessons on defining occupational interests, job interviewing, preparing a resumé, deportment and related topics. The majority of the time is spent in a realistic work situation. The expectations for the Work Experience Education program are that students will:

- (1) have an opportunity to participate in meaningful work
- (2) be enabled to explore career opportunities
- (3) gain an understanding of the importance of developing acceptable work habits, good grooming, and need for self-discipline
- (4) develop an understanding of positive attitudes for getting along with people
- (5) learn about the organization of business and the relationships of employee to employer, unions, and government, through direct contact with these agencies
- (6) assist students in making the transition from school to the world of work.

VI. SAFETY

Every lab/shop must have an effective safety program. Students must be taught, in each and every course studied within the industrial education framework, the "hows and whys" inherent in the safety program. It is the responsibility of the teacher to give continuous and vigilant supervision to ensure that all students are aware of and use safe practices. A good safety program should include:

1. Regular and thorough instruction and demonstration.
2. Developing an awareness of unsafe acts and conditions.
3. Checking and evaluation of student safety habits by the teacher.
4. First aid equipment and supplies kept in first-class condition.
5. Non-skid paint and clearly marked working areas around all machinery.
6. Proper clothing with particular attention to eye protection.
7. Machines and tools in good working condition.
8. Routine reporting of all accidents.
9. Good housekeeping.

The following is a sample of safety regulations which the teacher should consider basic:

1. Power machines shall be used by a student only after specific instruction has been given with regard to safe operation and safety precautions.
2. Power machines shall not be used while the teacher is absent from the lab/shop.

3. Machines shall not be used by any student unless adequately guarded.
4. Approved eye protection must be worn for certain operations.

There are five basic steps in safety education:

1. Set a good safety example for students.
2. Help each student thoroughly understand the safety precautions related to his task. Stress the two aspects of safety: the unsafe act and the unsafe condition.
3. Keep all tools sharp and in good condition.
4. Keep all safety devices in proper working condition.
5. Follow up safety instructions constantly. The lab/shop will be as safe as the teacher makes it.

Dress and deportment play an important part in the operation of a safe lab/shop program. Students and teacher should be neatly dressed at all times and the teacher should take care to ensure that no loose and dangerous clothing is worn. Safety aprons, goggles, gloves, should be used wherever necessary.

It should be pointed out that failure to comply with every reasonable safety precaution, may jeopardize the teachers' position in any claim for compensation. Each school should receive the excellent publications and bulletins dealing with accident prevention and safety procedures distributed by the Workers' Compensation Board.

NOTE: Accidents must be promptly reported to some senior school authority. If no other person is designated this authority is the Principal.

VII. ORGANIZATION FOR TEACHING

A. Teacher Qualification

First level courses identified by the numbers "10" or "12" may be taught by teachers of less than journeyman status but with competencies considered adequate by the school Principal and the Superintendent of Schools.

Second and third level courses identified as "22" or "32" must be taught by teachers qualified in the particular trade or technology as follows:

1. Journeyman certificate, or equivalent in the non-designated trade areas.
2. Valid teaching certificate.

B. Facility Standards

Facilities and staff used to teach senior career development courses for which Industrial Education grants are available must be approved annually by a Department of Education Consultant for Industrial Education. This approval is verified through the signature of the Consultant for Industrial Education on the SRI Form and a letter approving the courses and teachers listed on the SRI Forms.

C. Methodology

There are many methods available to the teacher to organize the learning environment so that students can effectively learn the content and skills suggested. Industrial Education, by the nature of its content, requires the direct application of theory to practical situations in which real problems are solved or manual skills developed. Activities that can be planned to achieve objectives include the following:

1. Practical Activities

On the basis of the students' own evaluations two thirds of the school population learn most effectively when engaged in practical activities. It follows that Industrial Education content should be taught to a large extent by making the courses activity oriented.¹

2. Experimental Activities

The experimental method is closely related to practical activities in that it involves students in doing things. Experiments should be organized so that the discoveries made are genuine and provide a sequence and continuity to the learning experience.

3. Individual Projects

Individual projects or study enable a student to engage in activities that are of a personal interest. Also they allow the student to set his own pace. Personalizing a course has a great deal of merit, and in the case of small enrolments may be an economic necessity.

4. Discussion

Students need the experience of interaction with the peer group and with experts. Discussion sessions need to be planned and the students required to prepare background material prior to the session.

5. Demonstrations

Both teacher and student demonstrations are a necessary tool in the learning activity program. Demonstrations often consist of showing "here's how" on the spot to the student who needs help. On the other hand they can be carefully planned as a part of a discussion or lecture to the group.

¹Department of Education Curriculum Evaluation Project Questionnaire Summary, 1972, page 10

6. Lectures

While lecturing is probably the most often used method the pay-off in changed student behavior is not high. There are times, however, when there is no other alternative to provide the students with information. Teachers of Industrial Education should evaluate the objectives they wish to achieve through a lecture and assess alternative ways of accomplishing them.

7. Audio-Visual Technology

Communication technology has vastly expanded the methods of information distribution. Through the use of films, slides, tapes, charts, pictures, T.V., and combinations of these the teacher can make information available to students in a variety of interesting ways. The use of audio-visual technology should be used to supplement the other methods of providing a learning environment.

Teachers are encouraged to make up their own aids, index them, and make them available for individual student use.

D. INSTRUCTIONAL MATERIAL

The methodology used will depend in large part on the resources the teacher has available. The following materials and instructional equipment are recommended.

1. References

As no single text book is prescribed the teacher should have funds available to develop a good reference library in the subject area as well as class sets of references where these are considered necessary.

2. Audio-Visual Materials and Equipment

The use of the overhead projector has become popular and it is an effective visual device. Transparencies can be made locally or purchased.

The slide projector and tape recorder can be effectively paired for individualizing instructional materials.

The cassette projector is a useful and easily used visual device.

Video tapes can be locally made and used over and over. Additional tapes can be made for use in other schools through the Alberta Education dubbing service.

Computer Aided Instruction (C.A.I.) is becoming operational and will help to individualize a student's program.

E. MANAGEMENT STRATEGIES

1. Organizing Students for Management

The environment of the Industrial Education lab/shops is unique in the number of opportunities available to develop student responsibility and leadership. Students' cooperation must be encouraged and obtained to maximize learning. Following is an outline of activities students can participate in:

Shop/Lab Management Organization and Responsibilities Superintendent

- a. Oversees entire personnel system.
- b. Calls clean-up.
- c. Dismisses class.

- d. Takes roll and keeps attendance records.
- e. Receives ideas and suggestions from the class.
- f. Suggests any possible shop improvements gained through experience as superintendent; also acts as class representative.
- g. Responsible for the assignment or election of new personnel.

Safety Foreman

- a. Is responsible for general safety program and its improvement.
- b. Posts safety posters and information.
- c. Keeps safety test record.
- d. Keeps inventory of first aid supplies and notifies teacher when additional supplies are needed.
- e. Fills out minor accident report forms.
- f. Reports any injuries to the teacher immediately.

Librarian

- a. Keeps the planning centre in good order.
- b. Keeps supply of planning sheets on hand.
- c. Checks out magazines, books and project files.
- d. Keeps track of library check-out cards.

Publicity

- a. Is responsible for bulletin boards and display cases as assigned by the teacher.
- b. Writes and gives to the school paper any articles for publication.

2. Teacher Planning

An effective educational program is usually based on forethought and planning. Industrial Education teachers may find the following ideas useful.

a. Plan for the Year

Use past experiences to lay out a long range plan for the whole year. Where double programming is required plan to coordinate common content. Plan a separate schedule for each course.

Outline - topics or field to be studied

- rotation system and change periods
- class groupings
- projects, products and costs

Duplicate the plan and distribute it to the students and teachers. Other teachers may see opportunities to integrate content. Involve other teachers to help develop academic competencies that students need to advance in their practical courses.

b. Outline each Module of Study

- list the behavioral objectives for each concept to be taught
- integrate lessons on safety
- prepare:
 - information sheets
 - assignments
 - audiovisual materials demonstrations
 - evaluation tests

c. Plan for a Week

Use the yearly and unit plan (a and b above) as a guide to plan the students' activities on a weekly basis outlining each days work. This forethought will provide time to obtain adequate supplies, have demonstration materials on hand, and give time for evaluation.

d. Keep good Records

Develop recording techniques that are simple enough to keep operational throughout the year. Use:

- wall charts
- record book
- individual class sheets

VIII. EVALUATION

A. Introduction

Evaluation is an important component of the teaching-learning process. By measuring student's growth in relation to their own previous performance and against standard criteria, data is obtained that gives the teacher an indication of each individual's strengths and weaknesses. Knowing this the teacher can plan the instructional program to compensate for student deficiencies.

To evaluate growth effectively criteria must first be established. These criteria may be set out in the form of behavioral objectives which must be understood by the students. The course guides have been written in the form of behavioral objectives to provide a model for teachers. The objectives written are suggestive and the teacher will need to add others to achieve the general course objectives.

B. Learning Domains

The teacher should plan for student growth in the three domains of learning. Bloom defined these as:

1. The cognitive domain - intellectual skills
2. The affective domain - emotional development
3. The psycho-motor domain - muscular growth and manipulative skills.

These domains were renamed by an Alberta committee of

Industrial Education teachers to more appropriately apply to the Industrial Education program. Their categories are as follows:

1. Intellectual Skills (Verbal and Written Communication).
2. Personal Growth.
3. Manipulative Skills.

Evaluation methods used should, in order to be fair to the student, measure growth in all three domains.

C. Definitions of Learning Categories

1. Intellectual Skills

Indicates the student's ability to comprehend the materials taught, his ability to solve problems and his ability to read and follow instructions.

2. Personal Growth

Indicates the student's concern for gaining knowledge, his attitude toward his work and other students, the responsibility accepted and an awareness of safety habits and procedures.

3. Manipulative Skills

Indicates the student's ability to perform operations with related tools and equipment in terms of expected standards in quality and quantity.

D. Learning Category Criteria

The criteria listed below are an eclectic compiled from a number of teacher developed systems. They may serve as a basis for planning local evaluation strategy.

1. Intellectual Skills

a. Knowledge of Facts

- (i) Those skills that indicate ability of comprehension,

planning, self-expression, neatness and conciseness of written work.

(ii) Those skills that indicate abilities of verbal expression in: succinctness, pertinence, convincingness and knowledge of terms.

b. Problem Solving

Those skills that indicate abilities in: originality, creativity and responsibility.

c. Following Instructions

(i) Skills that indicate to what degree instructions (written and verbal) are followed.

(ii) Skills that demonstrate abilities of understanding before acting as well as showing signs of self-motivation and additional research.

2. Personal Growth

a. Cooperation

Behavior that indicates the ability to work cooperatively with others.

b. Safety Awareness

Behavior that indicates the degree of concern for the safety of self as well as that of others.

c. Responsibility

Behavior that indicates the degree of acceptable self-discipline, conduct and temperament and accountability.

d. Personal Organization

Behavior that indicates the degree of organization in both the quality of the work done and the maintenance of clean and safe work areas.

- e. Social Sensitivity
 - (i) Behavior that indicates that he knows himself.
 - (ii) Shows appreciation and tolerance of others and is sympathetic towards others' needs.
 - (iii) Accepts criticism graciously.
- 3. Manipulative Skills
 - a. Quality

Skills that indicate a degree of accuracy, appearance, finish and workmanship in a project.
 - b. Quantity

Skills that indicate comparative speed in the completion of a task.

Using the categories outlined students should be more objectively evaluated with weightings apportioned according to the time spent on each category, i.e. where the course emphasizes practical skills the manipulative category will warrant more marks.

Teachers need to check their marking and testing procedures to ensure that:

- a. The student is being fairly treated.
- b. Measures are taken on several growth areas.
- c. The scheme used is consistent and continuously maintained.
- d. Students are evaluated on objectives they know they will be tested on.
- e. Provide for student self evaluation.

IX. LABORATORY OR SHOP ORGANIZATION

a. Layout

Students in most labs/shops work on a variety of projects, jobs, experiments, machines and research at different locations. The teacher's responsibility is to organize the layout of tools, equipment and work stations to provide a functional education and work environment. The plan must give consideration to safety, lighting, noise factors, dust, power, and relationship of work areas.

b. Inventory

1. Equipment

An up-to-date inventory should be kept in every facility. Records can be kept on cards or on sheets. An example of each is given.

Card Inventory

EQUIPMENT INVENTORY

Item No.

Quality _____

[illegible]

A horizontal timeline from 1900 to 2020. The timeline is marked with years: 1900, 1910, 1920, 1930, 1940, 1950, 1960, 1970, 1980, 1990, 2000, 2010, 2020. The word 'gender' is written above the timeline at approximately 1910, 1930, 1950, 1970, 1990, and 2010. The phrase 'gender equality' is written above the timeline at approximately 1960, 1980, and 2000. The timeline is a solid black line with small vertical tick marks for each year.

Supplier

Date Purchased	New	Used	Cost \$
----------------	-----	------	---------

Inventory Checks and Condition

[illegible]

Equipment on Sheets

<u>SHOP EQUIPMENT AND ACCESSORIES</u>	76	77	78	79	80
Arbor, "Delta" #145, Screw-On Left	S				
Adapter, "Delta" #935, for 12" Lathe	V				
Wire Wheels, "Black & Decker" #U1202, 6"	S				
Screw Centre, "Delta" #940, #2 M.T.	S				

Code: S - Satisfactory

R - Repair

U - Unsatisfactory - replace

2. Supplies and Materials

A current list of supplies and materials will aid in keeping an inventory of stock. A system should be developed that gives a correct inventory at the end of the school year or semester and the beginning of the next. An example of such an inventory follows:

Supply Inventory

Description	Size, Gauge	On Hand		Required		Value	
		Date	Amount	Date	Amount	On Hand	Required

c. Budgets

1. Capital Equipment

As equipment wears out or becomes obsolete it should be replaced. In order to maintain the lab/shop at an efficient level of operation and capable of meeting curricular needs, a yearly capital equipment budget is required. While industry depreciates equipment

and tools at 10 - 30% per year, the usage in school although rather severe due to lack of operator experience, is nevertheless not as intensive and thus the rate of depreciation can be lower. It is suggested that 5% per annum of total inventory value be set for equipment replacement. All equipment purchased from now on should be on the metric system.

2. Expendable Supplies

The lab/shop should have an ongoing stock of approximately \$2,000. worth of expendable supplies. This insures that no class is delayed because of lack of materials.

Many schools provide a fixed amount per student for materials. Costs incurred by the student on his own behalf above this amount is generally paid for by the student.

The fee must be set at the local level. When establishing the yearly fee per student consideration must be given to course requirements, cost of materials for assigned exercises or projects and anticipated waste.

3. Maintenance

A budget is required for maintenance of equipment and facilities. This budget will have to be increased as the equipment and facilities become older.

4. Instructional Materials

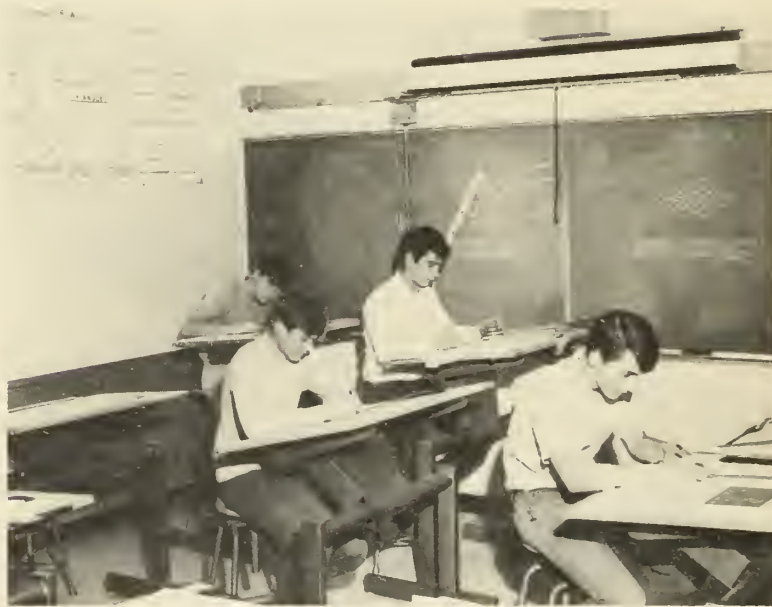
A budget for special books, audiovisuals, teaching aids, etc. is required.

5. Miscellaneous Tools and Replacement

Some school jurisdictions set aside funds to cover the costs of small tools and replacement tools up to \$25. without going through the usual requisition procedure.

6. Petty Cash

A teacher requires a petty cash fund to operate from day to day. This allows him to purchase small items or special items during the year. Ten dollars per teacher per month has proven quite satisfactory.



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=====

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